Patent Claims

1. Process for the production of half-tubes (24, 26) or tubes of a metallic, high-temperature-resistant material with a plurality of openings (22) passing through their surface, for the fabrication of heat- exchanger tubes for recuperative waste gas heat exchangers, using a precision-casting process.

2. Process according to claim 1 with the following process steps:
   - formation of a model, destroyable by heat, of each of the half-tubes (24, 26) or of the tube
   - formation of mold shells or a mold shell by finishing with a conventional gate system and immersion of the models or model in ceramic coating compositions and sanding with cast shell ceramic material (alternating in several cycles)
   - melting-out of the models or model from the mold shells or mold shell, e.g. in an autoclave
   - hardening of the mold shells or mold shell by firing
   - production of a melt from the metallic, high-temperature-resistant material
   - casting of the melt in the mold shells or mold shell by applying a vacuum or under excess pressure of an inert gas
   - after solidification of the melt, removal of the half-tubes or tube from the mold, by destroying the mold shells or mold shell
   - cleaning and trimming the half-tubes (24, 26) or tube and removal of the sprues or sprue
   - where necessary, post-treatment of the openings (22) passing through the surface (20) of the half-tubes (24, 26) or tube, by spark erosion (EDM - electrodischarge machining) or blasting with abrasive blasting agents

- in the case of the half-tubes: joining two half-tubes (24, 26) by means of high-temperature soldering or fusion welding to form a heat exchanger tube (12, 14).

3. Process according to claim 1 or 2, characterised in that wax is used as the model material.

4. Process according to one of claims 1 to 3, characterised in that at least the casting of the melt in the mold shell is carried out in the absence of reactive gases, in particular *in vacuo* or under an inert gas atmosphere or the like.

5. Process according to one of the preceding claims, characterised in that the melt is poured into hot mold shells.

6. Process according to one of the preceding claims, characterised in that a nickel-based alloy, in particular IN 625, is used as the high-temperature-resistant material for the precision casting process.

7. Half-tubes (24, 26) or tubes produced by the process according to claims 1 to 5, characterised in that the openings (22) passing through the surface (20) of the half-tubes (24, 26) or tubes are elliptical in shape.

8. Half-tubes or tubes according to claim 7, characterised in that the length of the half-tubes (24, 26) or tubes is 500 mm with a radius of 62.50 mm, or the length of the half-tubes (24, 26) or tubes is 750-900 mm with a radius of 37.50 mm.